Trend Study 24-3-03

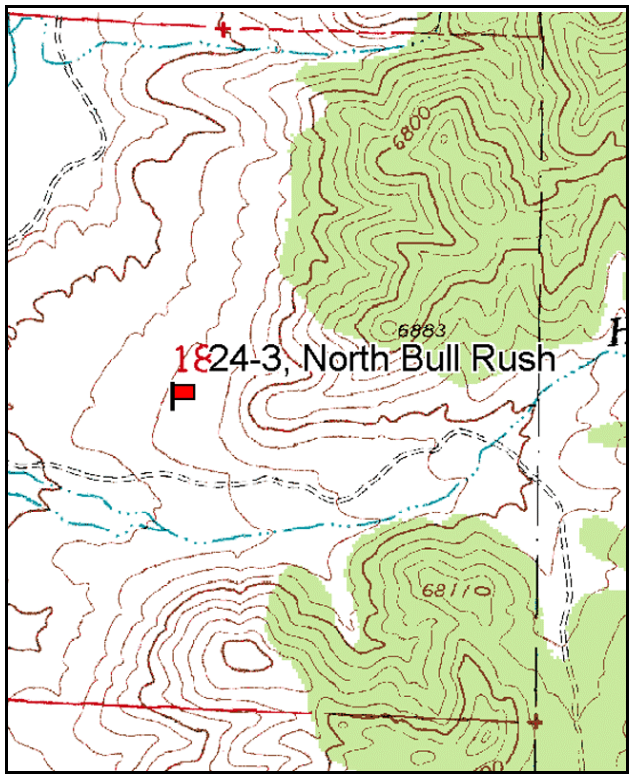
Study site name: North Bull Rush . Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 348 degrees magnetic. (Lines 3& 4 96° M)

Frequency belt placement: line 1 (11 & 95 ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

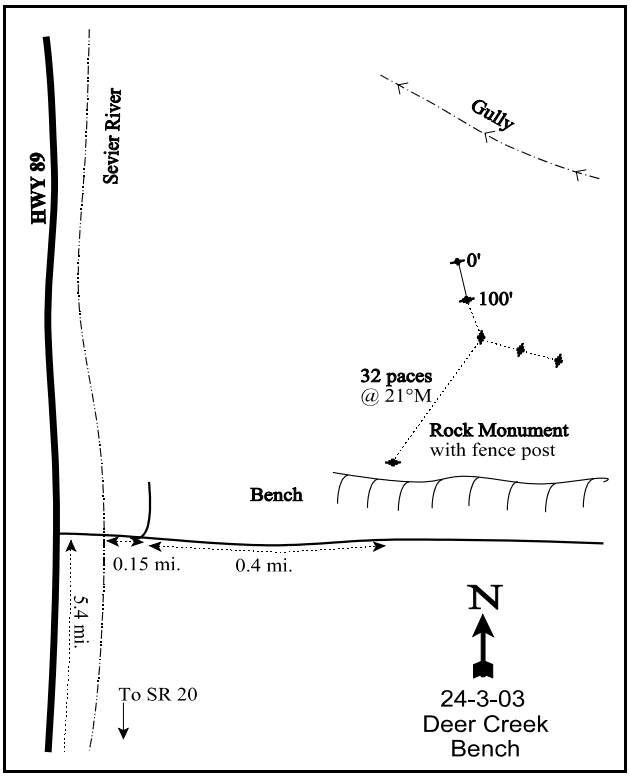
LOCATION DESCRIPTION

From the Highway 89 and SR20 Junction, proceed north on 89 for 5.4 miles. Here at the beginning of Circleville Canyon, turn right off the highway onto a dirt road. Cross the Sevier River, and go 0.15 miles to a gate and intersection. Go straight (east) for another 0.4 miles. Stop here. Walk 18 paces up on the edge of a low bench on the north side of the road at 356 degrees magnetic to a rock monument with a fencepost. Walk approximately 60 paces at 9 degree magnetic to the 100' baseline stake. The 0' stake is marked by browse tag #168.



Map Name: Bull Rush Peak

Township 32S , Range 4 1/2W , Section 18



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4209604 N, 381687 E

DISCUSSION

North Bull Rush - Trend Study 24-3

The North Bull Rush study samples a sagebrush bench located 1/4 mile west of the Forest Service boundary on BLM land at the mouth of Horse Valley Creek. Bull Rush Creek is located about ½ mile to the south. The sagebrush covered bench slopes gradually (3% to 5%) to the northwest at an elevation of 6,500 feet. The Sevier River is ½ mile west of the site. Agricultural land is located in the valley bottom between the site and the river. The bench is relatively small, a half mile long and a half mile wide at the widest point, and is dissected by numerous small gullies. This site is a key area for deer during the winter and spring. Deer pellet groups were abundant in 1991 and an antler drop was also found on the site that year. Few elk pellet groups were found and some sheep sign was also noted in 1991. During the 1997 reading, deer pellet groups were abundant with a quadrat frequency of 41%. A few elk pellet groups were also encountered. Pellet group data from 2003 estimated 27 deer days use/acre (66 ddu/ha). About 10% of the deer pellet groups sampled appeared to be from spring use while 90% were from winter use. No elk pellet groups were encountered. This BLM allotment is grazed with cattle by the adjacent private landowner. No sign of cattle was encountered in 1991, but some cattle sign was found in 1997. Cattle use was estimated 25 days use/acre in 2003 (63 cdu/ha). Some of the cattle pats encountered in 2003 were fresh but most appeared to be from the previous grazing season (2002).

The soil has a sandy loam texture with a considerable amount of pavement on the surface which is evidence of a long history of soil loss from the site. Soil at the site is characteristic of the alluvial deposits that form the low-lying foothills on the unit. Effective rooting depth was estimated at just over 13 inches with a high soil temperature (for this elevation) of 75°F at an average depth of nearly 12 inches. High soil temperatures are indicative of dry soil profiles. Average soil temperature in 1997 was about 58°F at about 15 inches in depth. Precipitation during the spring (April to June) of 1997 was 153% of normal at Panguitch while spring precipitation in 2003 was only 48% of normal. Organic matter is limited in the soil at only 1.4%. Phosphorus may also be limiting at only 7.1 ppm where the minimum for normal plant growth and development is thought to be 10 ppm. Some small gullies in the area are experiencing some down-cutting problems and the erosion condition class was determined to be slight in 2003.

Wyoming big sagebrush is both the dominant and key browse species on the site, with blue grama and needle-and-thread grass providing most of the herbaceous cover. Wyoming big sagebrush had a density of 6,666 plants/acre in 1987 declining slightly to 5,440 by 2003. Use was extremely heavy in 1987 and 1991 but more moderate in 1997 and light to moderate in 2003. The number of decadent plants has increased from 17% in 1987 to 67% in 1991 and 54% in 2003. Decadent sagebrush classified as dying has remained high at 31% in 1997 and 34% in 2003. Young recruitment has steadily declined from 14% in 1987 to 3% in 1997 and 0 by 2003. This would indicate that a decline in density will likely occur if recruitment does not improve. A few winterfat are also found on the site.

Herbaceous species diversity is very limited on this site, as is the case with most Wyoming big sagebrush communities. The herbaceous understory is composed mostly of blue grama, bottlebrush squirreltail, and needle-and-thread grass. These three grasses produced 10% cover in 1997 and 12% in 2003. Forbs are almost nonexistent.

1991 TREND ASSESSMENT

The soil trend would be considered slightly downward because of some of the key parameters measured. Vegetative basal cover and litter cover both declined while both pavement and bare ground increased since 1987. Trend for the key browse species, Wyoming big sagebrush, is down. It's population has decreased by

19% with the rate of decadence going from 17% to 67%. The herbaceous understory is slightly declining. The most abundant grass, needle-and-thread, is stable with an 85% quadrat frequency. Nested frequency of blue grama and bottlebrush squirreltail have declined significantly. The forbs are almost nonexistent on this site, but with what few species are present, all have declining quadrat frequencies.

TREND ASSESSMENT
soil - slightly downward (2)
browse - down (1)
herbaceous understory - slightly downward (2)

1997 TREND ASSESSMENT

Trend for the soil is stable but in poor condition due to the lack of herbaceous vegetation and litter cover. Percent bare ground, litter, and pavement cover are similar to 1991 estimates. Trend for Wyoming big sagebrush is slightly down due to a still moderately high percent decadency (48%), decline in percent young age class, and the percentage of decadent plants classified as dying has increased. Recruitment is poor and the population could decline further in the future if the proportion of seedlings and young do not improve. Trend for the herbaceous understory appears stable. Sum of nested frequency of grasses and forbs have remained similar to 1991 estimates. Nested frequency of the dominant grass, needle-and-thread, remains constant but the frequency of blue gramma increased while the nested frequency of bottlebrush squirreltail declined significantly.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is down slightly. Percent cover of vegetation and litter declined slightly while cover of bare ground and rock/pavement increased slightly. There is evidence of some ongoing erosion in the form of flow patterns, gullies, and soil movement. Erosion is not severe however, due to the gentle terrain. Trend for Wyoming big sagebrush is down slightly. Density has declined 6%, vigor is poor on 18% of the plants sampled, and the number of decadent plants has increased from 48% to 54%. In addition, 34% or about 1,000 plants/acre of the decadent sagebrush sampled were classified as dying (>50% crown death). No seedlings or young were encountered in 2003. Without an improvement in recruitment this population will likely decline further by the time this site is reevaluated in 2008. Trend for the herbaceous understory is down slightly. Sum of nested frequency of perennial grasses declined slightly and no perennial forbs were encountered. The most abundant perennial grasses, blue grama and needle-and-thread, remained at similar nested frequencies. Average cover of perennial grasses rose in 2003 due to a more than 2 fold increase in blue grama cover (2% to 5%). Bottlebrush squirreltail decreased in frequency, as did sand dropseed which was not sampled in 2003.

TREND ASSESSMENT
soil - down slightly (2)
browse - down slightly (2)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Management unit 24 , Study no: 3

Type	Species	Nested Frequency				Average Cover %	
		'87	'91	'97	'03	'97	'03
G	Bouteloua gracilis	$_{b}$222	$_{a}$96	$_{a}$114	$_{a}$129	1.88	5.15
G	Bromus tectorum (a)	-	-	-	-	.00	-
G	Sitanion hystrix	$_{c}$138	$_{b}$76	$_{a}$35	$_{a}$4	.70	.05
G	Sporobolus cryptandrus	$_{a}$-	$_{b}$16	$_{b}$10	$_{a}$-	.10	-
G	Stipa comata	220	236	243	233	7.52	6.94
Total for Annual Grasses		0	0	0	0	0.00	0
Total for Perennial Grasses		580	424	402	366	10.21	12.14
Total for Grasses		580	424	402	366	10.21	12.14
F	Astragalus spp.	$_{b}$16	$_{ab}$4	$_{ab}$6	$_{a}$-	.01	-
F	Chenopodium spp. (a)	-	-	$_{b}$11	$_{a}$-	.03	-
F	Cryptantha fulvocanescens	7	-	-	-	-	-
F	Descurainia pinnata (a)	-	-	$_{a}$-	$_{b}$8	-	.10
F	Draba spp. (a)	-	-	-	1	-	.00
F	Erigeron pumilus	$_{b}$19	$_{ab}$3	$_{b}$7	$_{a}$-	.03	-
F	Gilia spp. (a)	-	-	3	-	.00	-
Total for Annual Forbs		0	0	14	9	0.03	0.11
Total for Perennial Forbs		42	7	13	0	0.04	0
Total for Forbs		42	7	27	9	0.07	0.11

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 24 , Study no: 3

Type	Species	Strip Frequency		Average Cover %	
		'97	'03	'97	'03
B	Artemisia tridentata wyomingensis	91	89	13.67	9.01
B	Ceratoides lanata	1	1	-	-
B	Chrysothamnus viscidiflorus stenophyllus	4	3	.15	.15
B	Opuntia spp.	3	2	.18	.15
B	Pediocactus simpsonii	0	1	-	-
Total for Browse		99	96	14.00	9.30

CANOPY COVER, LINE INTERCEPT --
Management unit 24 , Study no: 3

Species	Percent Cover '03
Artemisia tridentata wyomingensis	9.81
Chrysothamnus viscidiflorus stenophyllus	.16

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 24 , Study no: 3

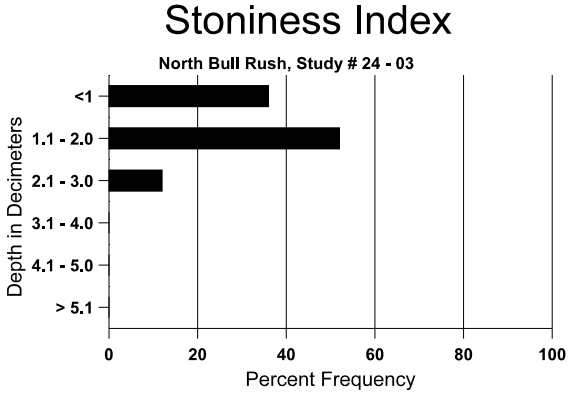
Species	Average leader growth (in) '03
Artemisia tridentata wyomingensis	1.4

BASIC COVER --
Management unit 24 , Study no: 3

Cover Type	Average Cover %			
	'87	'91	'97	'03
Vegetation	11.75	9.25	25.75	22.20
Rock	2.25	1.00	1.43	3.08
Pavement	30.75	36.25	35.46	39.82
Litter	39.50	30.75	28.81	22.23
Cryptogams	1.25	1.75	.72	.30
Bare Ground	14.50	21.00	17.67	19.64

SOIL ANALYSIS DATA --
Management unit 24, Study no: 3, Study Name: North Bull Rush

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.4	75.0 (11.7)	6.7	60.4	20.1	19.6	1.4	7.1	208.0	0.6



PELLET GROUP DATA --
Management unit 24 , Study no: 3

Type	Quadrat Frequency '97	Quadrat Frequency '03	Days use per acre (ha) '03
Rabbit	8	53	-
Elk	4	2	-
Deer	41	16	27 (66)
Cattle	3	13	25 (63)

BROWSE CHARACTERISTICS --
Management unit 24 , Study no: 3

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis											
87	**6666**	66	933	4600	1133	-	15	85	17	3	14/18
91	**5400**	-	400	1400	3600	-	52	38	67	32	19/23
97	**5800**	200	180	2840	2780	2720	60	7	48	16	15/28
03	**5440**	-	-	2500	2940	1280	23	0	54	18	16/24
Ceratoides lanata											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
97	**20**	-	-	20	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	100	-	0	7/4
Chrysothamnus viscidiflorus stenophyllus											
87	**933**	-	-	933	-	-	93	7	0	0	6/7
91	**66**	-	-	66	-	-	0	100	0	100	2/3
97	**100**	-	-	100	-	-	0	0	0	0	8/11
03	**80**	-	-	60	20	-	0	0	25	25	9/9
Opuntia spp.											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
97	**60**	-	-	60	-	-	0	0	-	0	6/13
03	**40**	-	-	40	-	-	0	0	-	50	4/15
Pediocactus simpsonii											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
97	**0**	-	-	-	-	-	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
03	**20**	-	-	20	-	-	0	0	-	0	1/3
Pinus edulis											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	66	-	-	-	-	0	0	-	0	-/-
97	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-